DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: Premcor Port Arthur Refinery (Formerly Chevron Products Co.)
Facility Address: 2001 S. Gulfway Drive Port Arthur, TX 77640
Facility EPA ID #: TXD08090409

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   √ If yes - check here and continue with #2 below.

   If no - re-evaluate existing data, or
   If data are not available skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, (GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

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2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

   √ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.
   If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."
   If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The exposure pathway analyses that have been conducted for human health risk assessments at the Facility indicate that groundwater is not used for drinking water or industrial purposes. In addition, the groundwater underlying the Facility is nonpotable. Because the groundwater is nonpotable and land use is industrial, Texas regulations allow the groundwater results to be compared to nonpotable industrial MSCs (GW-Ind x 100). Only three wells had one-time exceedances of these protective levels: MW3-44S for benzene in the South Plant, MW1-3 for N-nitrosodipropylamine in the CrudeTriangle, and MW5-NP for dibenz(a,h)anthracene in the North Plant.

References:

Chevron. *RFI Report for Nonpriority Action Areas.* Port Arthur Facility, Port Arthur, Texas. April 2001

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

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3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"2 as defined by the monitoring locations designated at the time of this determination)?

   √ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).
   If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) – skip to #8 and enter "NO" status code, after providing an explanation.
   If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Facility investigations to date have indicated that the area groundwater has very limited movement. Results of ongoing Perimeter Monitoring Network (PMN) and RCRA CAMU Programs support this conclusion. Time-series plots of various constituents from wells within both programs show stabilization with no consistent increasing trends.

Moreover, vertical and horizontal movement of contaminated groundwater is limited by the low permeability clays comprising the shallow subsurface. Calculated groundwater velocities range from ‹ 1 to 17 feet per year, with an approximate average of 2 feet per year. Monitoring and other investigations have confirmed that there is negligible transport of hazardous constituents away from source areas.

These observations and conclusions have been made based on the information contained in the following reports:

Chevron. *RFI Report for Nonpriority Action Areas.* Port Arthur Facility, Port Arthur, Texas. April 2001.

Chevron. *2001 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2002.

Chevron. *2000 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2001.

Chevron. *1999 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2000.

Chevron. *1998 Perimeter Monitoring Network Annual Report*. Port Arthur Facility, Port Arthur, Texas. March 1999.

Chevron. *1997 Perimeter Monitoring Network Annual Report*. Port Arthur Facility, Port Arthur, Texas. March 1998.

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

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4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

__√__ If yes – continue after identifying potentially affected surface water bodies.
If no – skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.
If unknown – skip to #8 and enter "IN" status code.

Rationale Reference(s):

As discussed in Response No. 2 above, only three monitoring wells had a one-time exceedance of protective levels. Monitoring well NW5-NP is located within the south central portion of North Plant; groundwater flow within this portion of the facility is onsite and towards this monitoring well. This well is approximately 4,500 feet from the closest surface water body and is surrounded by numerous monitoring wells showing no exceedances of protective levels. Based on these findings, groundwater in the vicinity of MW5-NP does not discharge into a surface water body and this exceedance appears to be limited to this well and a single sampling event.

Monitoring well MW1-3 is located in the southern portion of the Crude Triangle, groundwater flow in this portion of the facility is onsite towards this monitoring well. The well is approximately 1200 feet from the closest surface water body. Data from this well was recently evaluated under an Affected Property Assessment Report (APAR) conducted for AOC 10. Results of that investigation showed no constituents above the TRRP Residential Assessment Levels. Adjacent monitoring wells also show no exceedances of protective levels. Based on these findings, groundwater in the vicinity of MW1-3 does not discharge into a surface water body and this exceedance appears to be limited to this well and a single sampling event.

Monitoring well MW3-44S is located in the southwestern portion of the South Plant and the well is within 200 feet of a surface water body, the Turning Basin. This well was removed during construction activities and has been replaced by MW3-46S. Results of groundwater level monitoring generally show a slight gradient inward from the Turning Basin. This well is also located behind a sheet pile wall that significantly inhibits groundwater flow to the Turning Basin. Results from MW3-44S had a one-time exceedance of the nonpotable industrial MSCs for benzene. Based on these findings, contaminated groundwater in the vicinity of MW3-44S has not likely discharged into the Turning Basin.

References:

Chevron. *Area of Concern 10 Affected Property Assessment Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. August 2002.

Chevron. *RFI Report for Nonpriority Action Areas.* Port Arthur Facility, Port Arthur, Texas. April 2001.

Chevron. *2000 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2001.

Chevron. *1999 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2000.

Chevron. *1998 Perimeter Monitoring Network Annual Report*. Port Arthur Facility, Port Arthur, Texas. March 1999.

Chevron. *1997 Perimeter Monitoring Network Annual Report*. Port Arthur Facility, Port Arthur, Texas. March 1998.

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5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration 3 of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting:

1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and
2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) – continue after documenting:

1) the maximum known or reasonably suspected concentration 3 of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and
2) for any contaminants discharging into surface water in concentrations 3 greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

____ If unknown – enter "IN" status code in #8.

Rationale and Reference(s):

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

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6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

If yes - continue after either:

1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR
2) providing or referencing an interim-assessment[5], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

[4] Because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

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7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

√	If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination." If no - enter "NO" status code in #8. If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

Chevron continues to monitor Facilitywide groundwater quality under the PMN and RCRA CAMU programs (see attached map that identifies current PMN and RCRA monitoring program locations).

References to date:

Chevron. *2001 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2002.

Chevron. *2000 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2001.

Chevron. *1999 Consolidated Annual Progress Report.* Port Arthur Facility, Port Arthur, Texas. Chevron Environmental Management Company. March 2000.

Chevron. *1998 Perimeter Monitoring Network Annual Report*. Port Arthur Facility, Port Arthur, Texas. March 1999.

Chevron. *1997 Perimeter Monitoring Network Annual Report*. Port Arthur Facility, Port Arthur, Texas. March 1998.

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8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

__√__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified.

___ NO - Unacceptable migration of contaminated groundwater is observed or expected.

_ IN - More information is needed to make a determination.

As discussed in Responses 2 and 4 above, exceedances of protective levels have been detected one-time in only three wells. Monitoring data from surrounding wells indicate that these exceedances are limited to these wells and are not a widespread occurrence. Review of groundwater data collected over the past 10 years shows no evidence of migration of groundwater above protective levels.

Groundwater in one well, MW3-44S is within 200 feet of a surface water body, the Turning Basin. Results from this well indicated a one-time exceedance of the nonpotable industrial MSCs for benzene. Results of groundwater level monitoring generally show a slight gradient inward from the Turning Basin. This well is also located behind a sheet pile wall that significantly inhibits groundwater flow to the Turning Basin. Based on these findings, groundwater in the vicinity of MW3-44S has not likely discharged into the Turning Basin.

Chevron continues to monitor Facilitywide groundwater quality under the PMN and RCRA CAMU programs.

Completed by _____ Date 8/23/2002
Mike D. Manka
Regulatory &Compliance Specialist

Supervisor _____ Date 8/23/2002
James Mailey
Manager
(EPA Region or State) 6

Locations where References may be found:

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3400 Hwy 365
Suite 210
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Texas Natural Resource Conservation Commission
Region 10 Office
3870 Eastex Freeway
Beaumont, Texas 77703-1892

Remediation Division
Texas Natural Resource Conservation Commission
12100 PARK CIRCLE 35, BUILDING F
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